

Appl. No. 10/262,470

Reply to Examiner's Action dated January 25, 2006

**REMARKS/ARGUMENTS**

The Applicants have carefully considered this application in connection with the Examiner's Action and respectfully request reconsideration of this application in view of the following remarks.

The Applicants originally submitted Claims 1-16 in the application. The Applicants previously amended various claims and cancelled Claim 4. Accordingly, Claims 1-3 and 5-16 are currently pending in the application.

**I. Rejection of Claims 1, 2, 3 and 15-16 under 35 U.S.C. §103**

The Examiner maintains his rejection of these claims under 35 U.S.C. §103(a) as unpatentable over Applicant's Admitted Prior Art (AAPA), as previously presented, in view of U.S. Patent No. 6,410,985 to Chan (Chan). As the claims presently stand, they are not obvious in view of the asserted combination. The Examiner admits that AAPA does not disclose that  $X_1$  is greater than  $X_2$  and also admits that Chan does not expressly state the ratio of  $X_1$  to  $X_2$  being 3 to 2. However, in spite of any teaching or suggestion of this, the Examiner takes the position that it would have been obvious to arrive at the recited ratio of  $X_1$  to  $X_2$  being greater than 3 to 2 because "thicker layers are undesirable as unnecessarily filling a portion of the limited width of the groove."

To support this position, the Examiner relies on figures 2A-2G in Chan and states that it is apparent from the figures that the ratio is greater than 3 to 2. Regardless of whether the Examiner's rough calculations result in the claimed ratio, with which the Appellants currently take issue, MPEP §2125 prohibits using proportions of features in a drawing as evidence of actual

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proportions, when the drawings are not to scale. In addition to MPEP §2125, the Courts have found that when the reference does not disclose that the drawings are to scale, and is silent as to dimensions; arguments based on measurement of the drawing features are of little value. *In Re Wright*, 569 F.2d 1124, 193 U.S.P.Q. 332 (CCPA 1977). *In Re Anwar K. Chitayat*, 408 F.2d 475, 161 U.S.P.Q. 224 (CCPA 1969). There is nothing in Chan that the Applicants can find that teaches the figures are to scale. Accordingly, actual measurements of the drawings cannot be used to establish obviousness of the recited ratio.

The Applicants have previously stated that Chan at best only teaches that due to the difficulty of achieving a build-up of metal on the sidewalls of the narrow trench, one should deposit approximately 300 angstroms of metal (Col. 5, lines 63-67). Furthermore, there is not even a requirement in Chan that the adhesion layer be thinner on the side wall. At Col. 5, line 64, Chan states that the adhesion layer 202 may be thinner on the sidewall than on the bottom of the groove. This is yet further confirmation that the asserted combination does not teach or suggest the recited ratio.

Moreover, as the Applicants have stated in their previous communication, the asserted combination does not address the problems addressed by the claimed invention, which is preventing migration through the porous high K dielectric material by plugging the pores on the side walls of the opening with a barrier layer have the recited ratios. Given the combination's failure to recognize the problem and solution and provide, even in a general way, thickness ratios that would address that problem, the Applicants reiterate that one skilled in the art would not be motivated to optimize the thickness ratios recited in Claims 1, 7, 11, and 15 based on the combined teachings of Chan and the

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AAPA. Accordingly, the asserted combination fails to establish a *prima facie* case of obviousness with respect to independent claims 1, 7, 11 and 15 and their respective dependent claims.

The Examiner, in rebuttal to Applicants' previous filed response, states that the recited dimensions are obvious because the specification does not contain any disclosure of either the critical nature of the claimed dimensions or any unexpected results arising therefrom. The Applicants respectfully submit that this is incorrect. The specification discusses the problems associated with using porous high K dielectric materials. In prior art applications, the barrier layer would often migrate into the porous material and cause shorts with near by interconnects. To alleviate this problem the claimed invention provides a very thin barrier layer having the recited ratio that plugs these pores or openings to a degree sufficient to prevent migration of the fill metal, thereby avoiding the problems associated with prior art processes. For the Examiner's convenient reference, this discussion can be found in the specification at page 3, lines 1-11 and page 9, lines 4-24. Therefore, the recited dimensions are of a critical nature because the claimed invention seeks to plug the pores with a layer having the recited ratio to prevent metal migration and resulting shorts that might occur from that migration.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 1-3 and 5-16 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

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## II. Conclusion

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-3 and 5-16.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application. The Commissioner is hereby authorized to charge any fees, credits or overpayments to Deposit Account 20-0668.

Respectfully submitted,

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